FIG.1

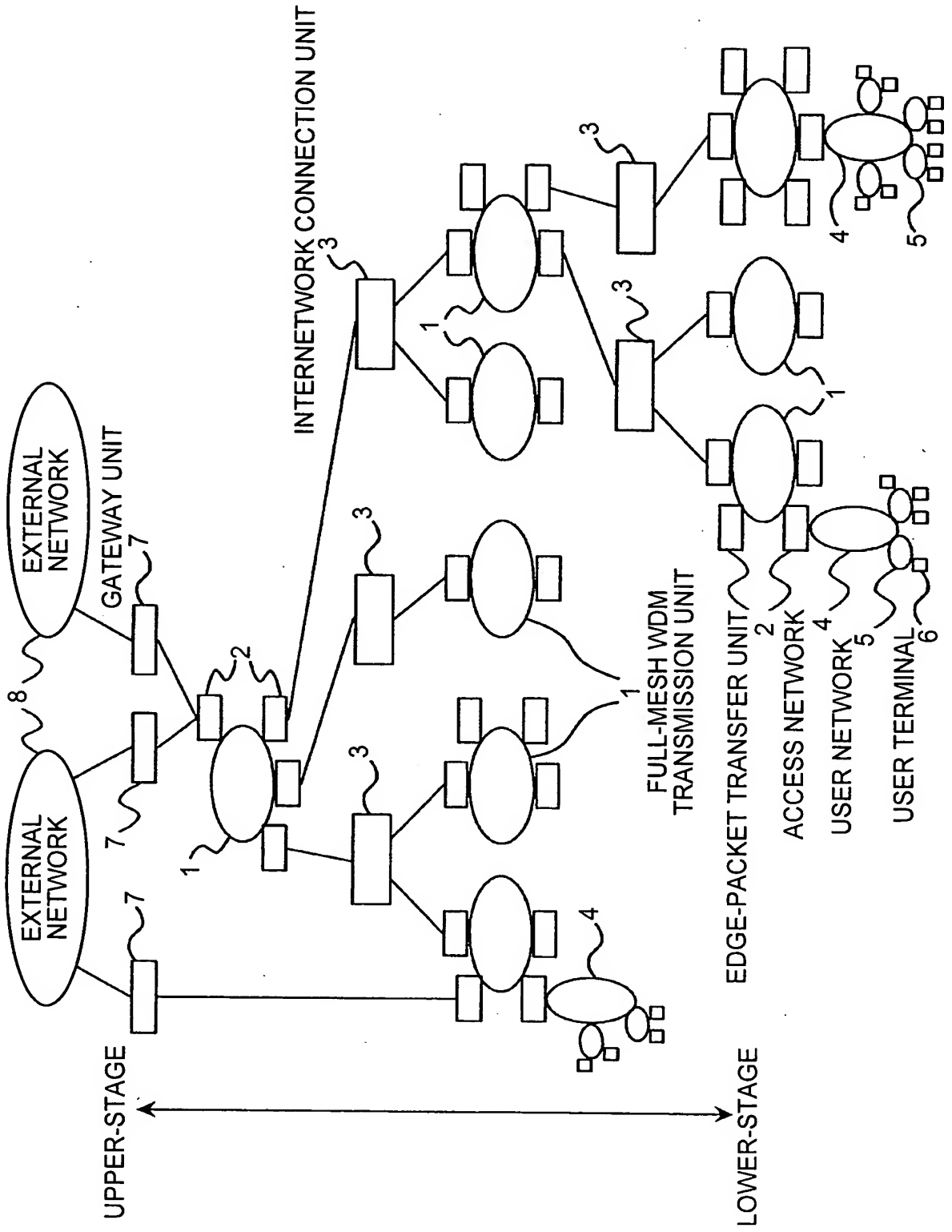
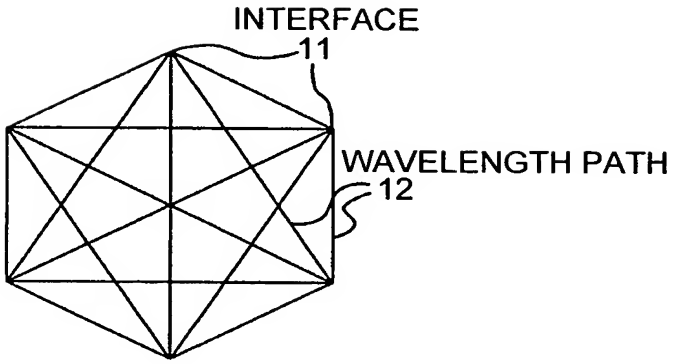
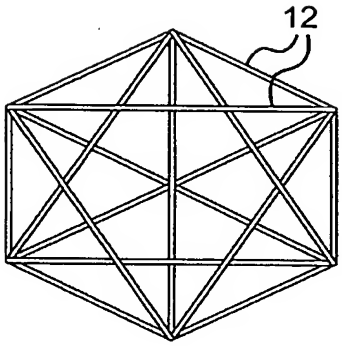

EXTERNAL NETWORK
EXTERNAL NETWORK
GATEWAY UNIT
INTERNETWORK CONNECTION UNIT
FULL-MESH WDM TRANSMISSION UNIT
EDGE-PACKET TRANSFER UNIT
ACCESS NETWORK
USER NETWORK
USER TERMINAL
UPPER-STAGE
LOWER-STAGE

FIG.2

(a)



(b)



(c)

		RECEPTION INTERFACE NUMBER				
		1	2	3	···	n
TRANSMISSION INTERFACE NUMBER	1		λ1	λ2	···	λn−1
	2	λn−1		λ1	···	λn−2
	3	λn−2	λn−1		···	λn−3
	···	···	···	···		···
	n	λ1	λ2	λ3	···	

FIG.3

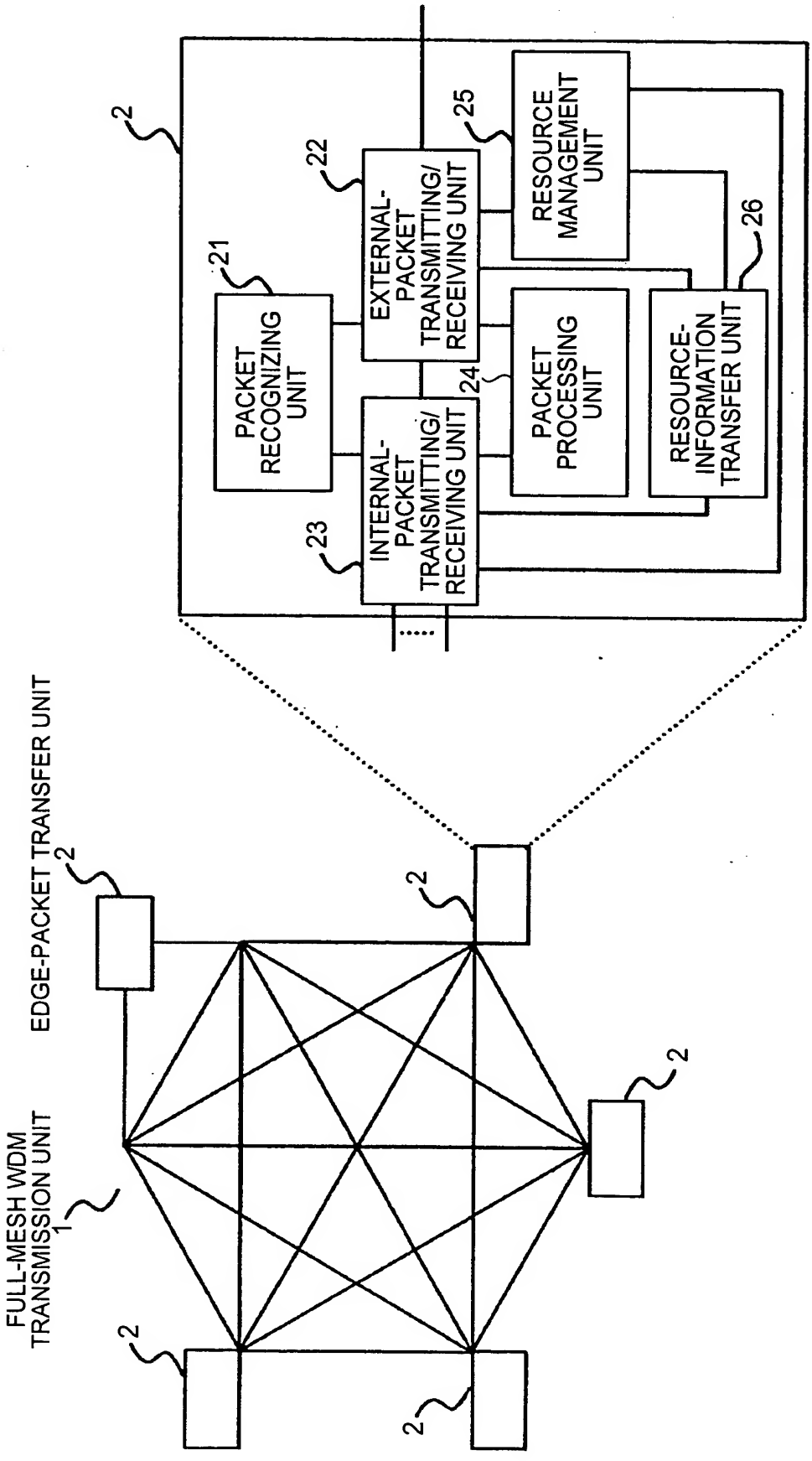

FULL-MESH WDM TRANSMISSION UNIT
1
EDGE-PACKET TRANSFER UNIT
2
2
2
2
2
2
PACKET RECOGNIZING UNIT
21
EXTERNAL-PACKET TRANSMITTING/ RECEIVING UNIT
22
INTERNAL-PACKET TRANSMITTING/ RECEIVING UNIT
23
PACKET PROCESSING UNIT
24
RESOURCE MANAGEMENT UNIT
25
RESOURCE-INFORMATION TRANSFER UNIT
26

FIG.4

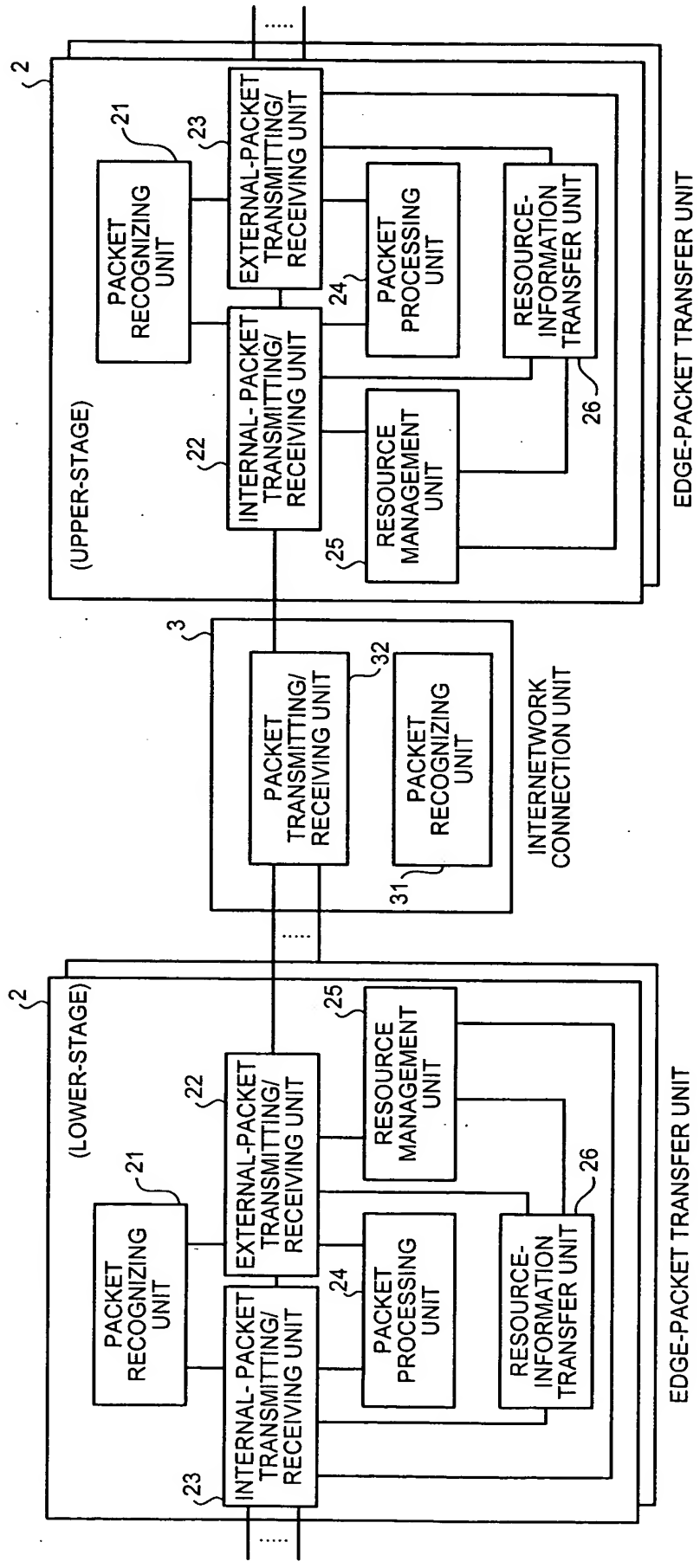

2
(UPPER-STAGE)
PACKET RECOGNIZING UNIT
21
EXTERNAL-PACKET TRANSMITTING/ RECEIVING UNIT
23
PACKET PROCESSING UNIT
24
RESOURCE-INFORMATION TRANSFER UNIT
26
INTERNAL- PACKET TRANSMITTING/ RECEIVING UNIT
22
RESOURCE MANAGEMENT UNIT
25
EDGE-PACKET TRANSFER UNIT
3
PACKET TRANSMITTING/ RECEIVING UNIT
32
PACKET RECOGNIZING UNIT
31
INTERNETWORK CONNECTION UNIT
2
(LOWER-STAGE)
PACKET RECOGNIZING UNIT
21
EXTERNAL-PACKET TRANSMITTING/ RECEIVING UNIT
22
RESOURCE MANAGEMENT UNIT
25
PACKET PROCESSING UNIT
24
RESOURCE-INFORMATION TRANSFER UNIT
26
INTERNAL- PACKET TRANSMITTING/ RECEIVING UNIT
23
EDGE-PACKET TRANSFER UNIT

FIG.5

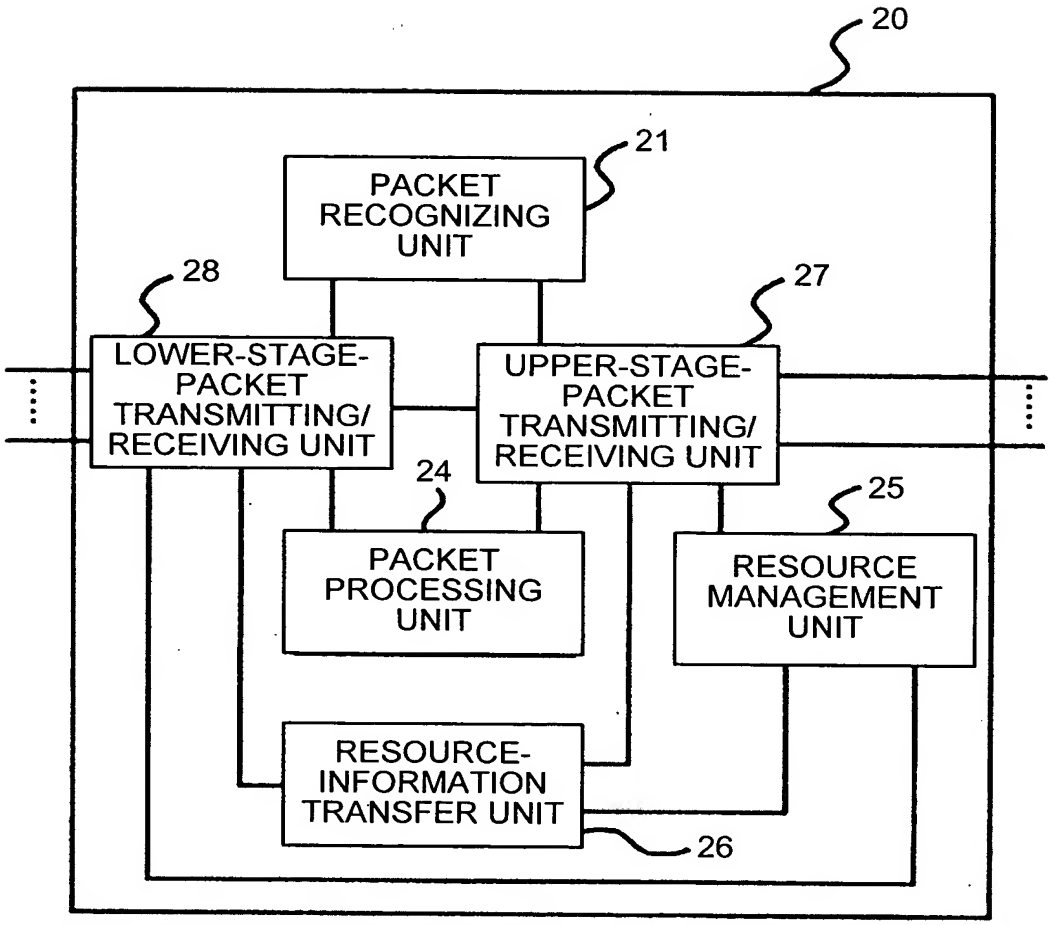

20
21
PACKET RECOGNIZING UNIT
28
27
LOWER-STAGE-PACKET TRANSMITTING/ RECEIVING UNIT
UPPER-STAGE-PACKET TRANSMITTING/ RECEIVING UNIT
24
25
PACKET PROCESSING UNIT
RESOURCE MANAGEMENT UNIT
RESOURCE-INFORMATION TRANSFER UNIT
26
INTERNETWORK-CONNECTION AND EDGE-PACKET TRANSFER UNIT

FIG.6

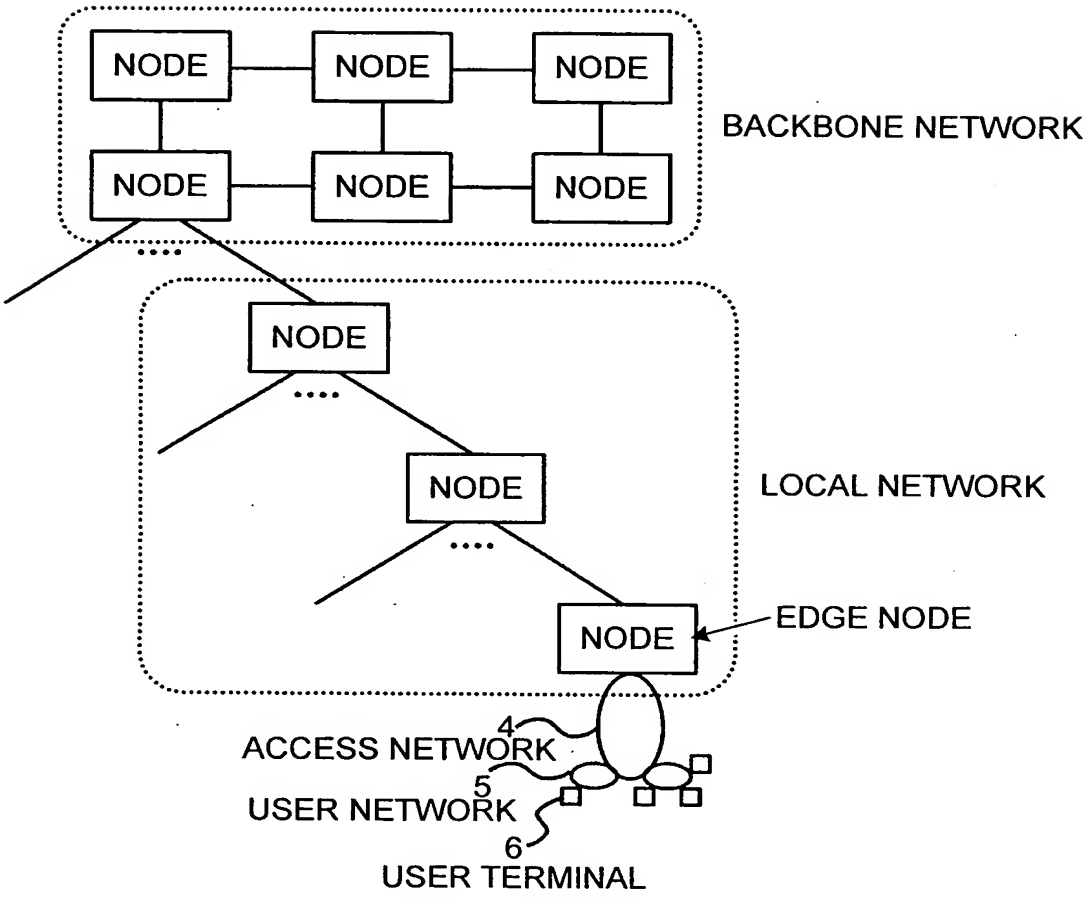

NODE
NODE
NODE
NODE
NODE
NODE
BACKBONE NETWORK
NODE
NODE
LOCAL NETWORK
NODE
EDGE NODE
4
ACCESS NETWORK
5
USER NETWORK
6
USER TERMINAL

FIG.7

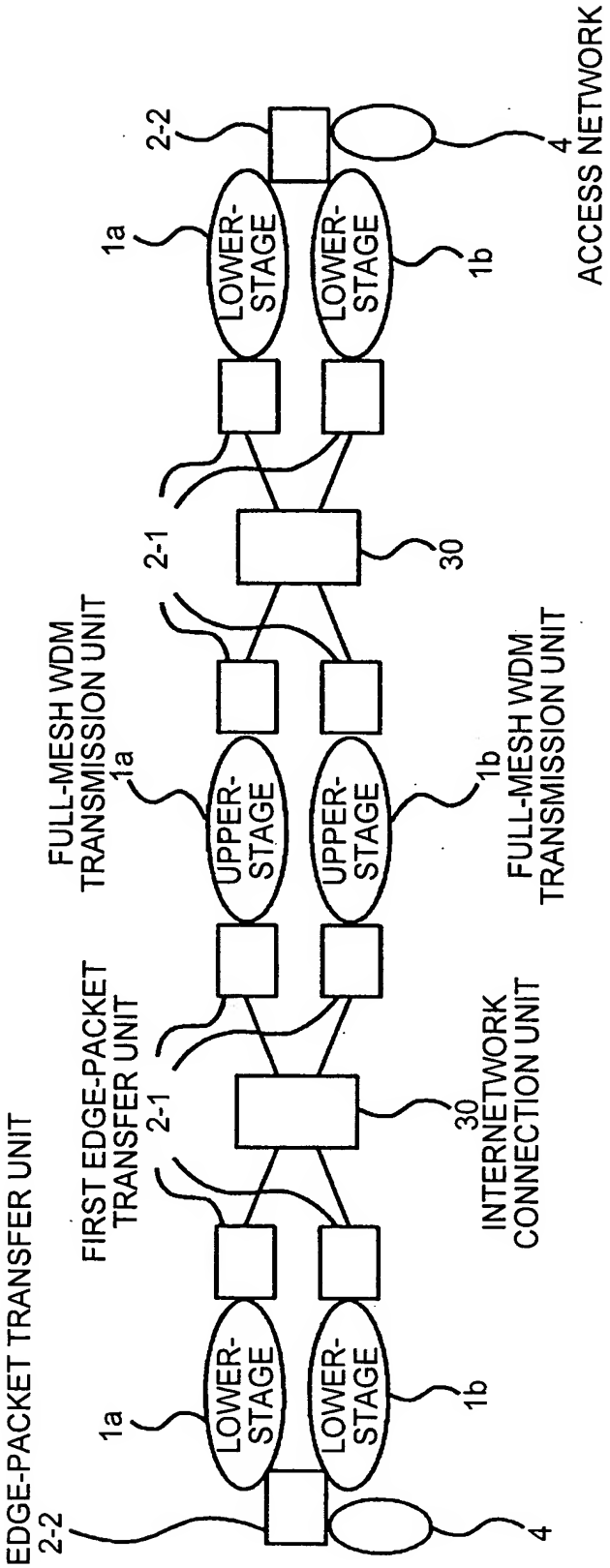

SECOND EDGE-PACKET TRANSFER UNIT
2-2
1a
LOWER-STAGE
LOWER-STAGE
1b
4
FIRST EDGE-PACKET TRANSFER UNIT
2-1
FULL-MESH WDM TRANSMISSION UNIT
1a
UPPER-STAGE
UPPER-STAGE
1b
FULL-MESH WDM TRANSMISSION UNIT
INTERNETWORK CONNECTION UNIT
30
2-1
1a
LOWER-STAGE
LOWER-STAGE
1b
2-2
4
ACCESS NETWORK

FIG.8

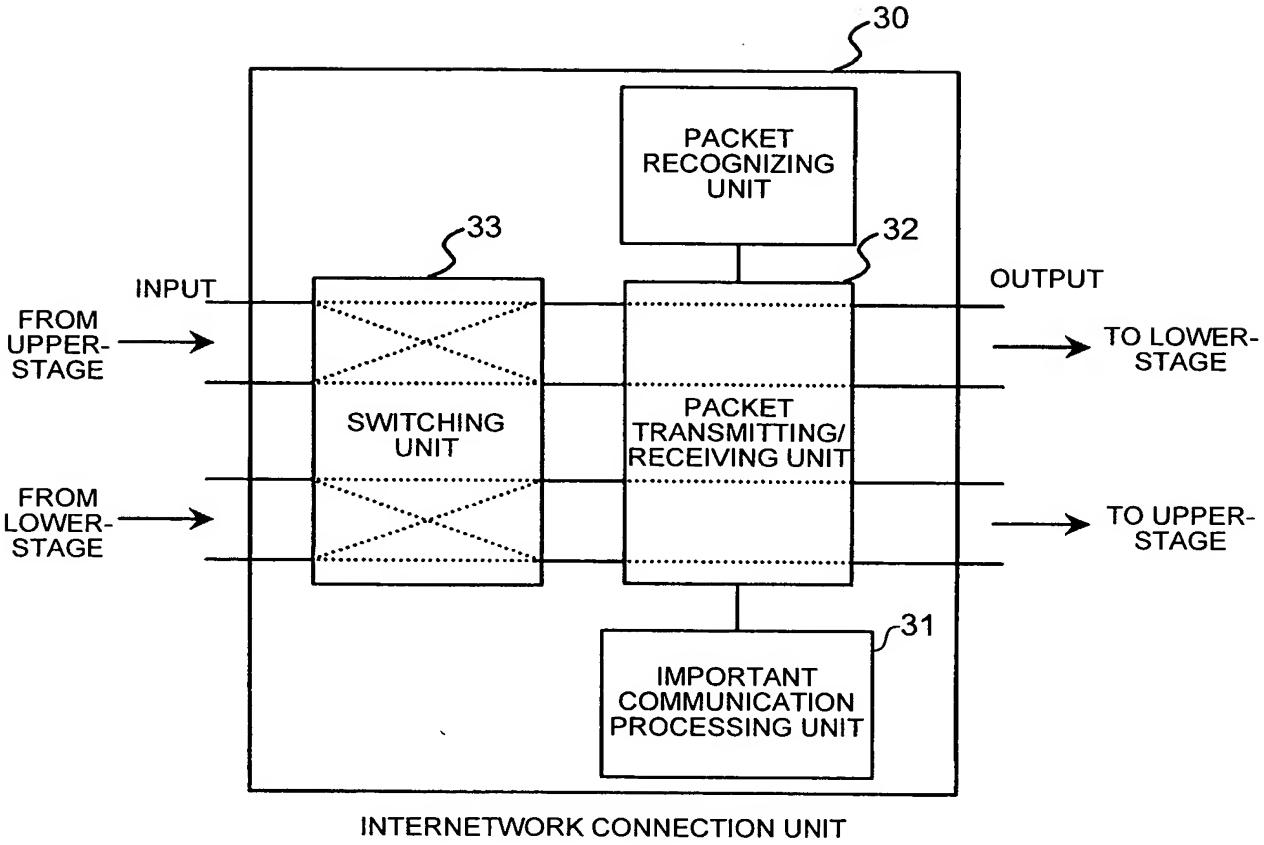

30
PACKET RECOGNIZING UNIT
33
32
INPUT
OUTPUT
FROM UPPER-STAGE
TO LOWER-STAGE
SWITCHING UNIT
PACKET TRANSMITTING/ RECEIVING UNIT
FROM LOWER-STAGE
TO UPPER-STAGE
31
IMPORTANT COMMUNICATION PROCESSING UNIT
INTERNETWORK CONNECTION UNIT

FIG.9

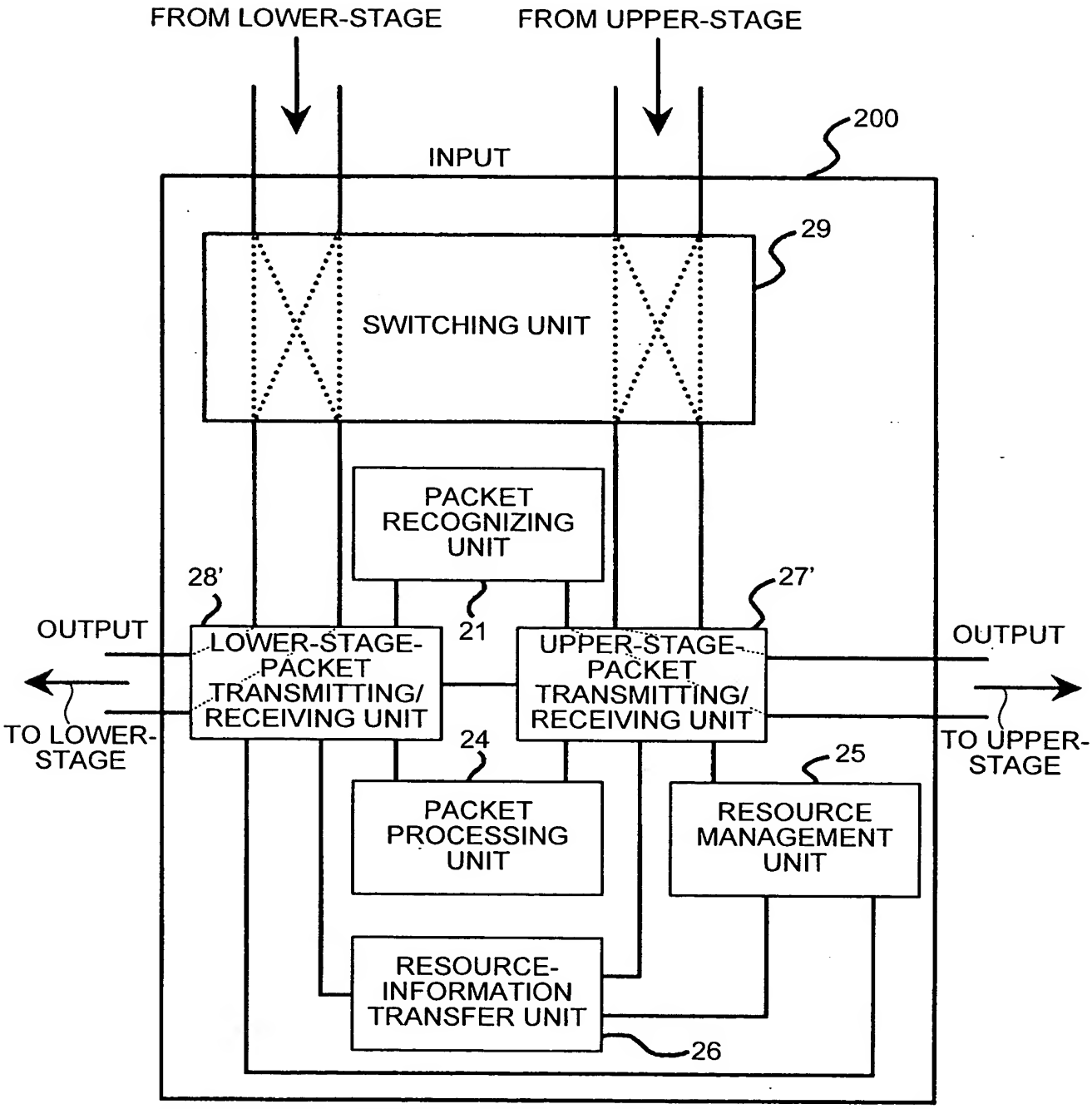

FROM LOWER-STAGE
FROM UPPER-STAGE
200
INPUT
29
SWITCHING UNIT
PACKET RECOGNIZING UNIT
28'
27'
21
OUTPUT
LOWER-STAGE-PACKET TRANSMITTING/ RECEIVING UNIT
UPPER-STAGE-PACKET TRANSMITTING/ RECEIVING UNIT
OUTPUT
TO LOWER-STAGE
TO UPPER-STAGE
24
25
PACKET PROCESSING UNIT
RESOURCE MANAGEMENT UNIT
RESOURCE-INFORMATION TRANSFER UNIT
26
INTERNETWORK-CONNECTION AND EDGE-PACKET TRANSFER UNIT

FIG.10

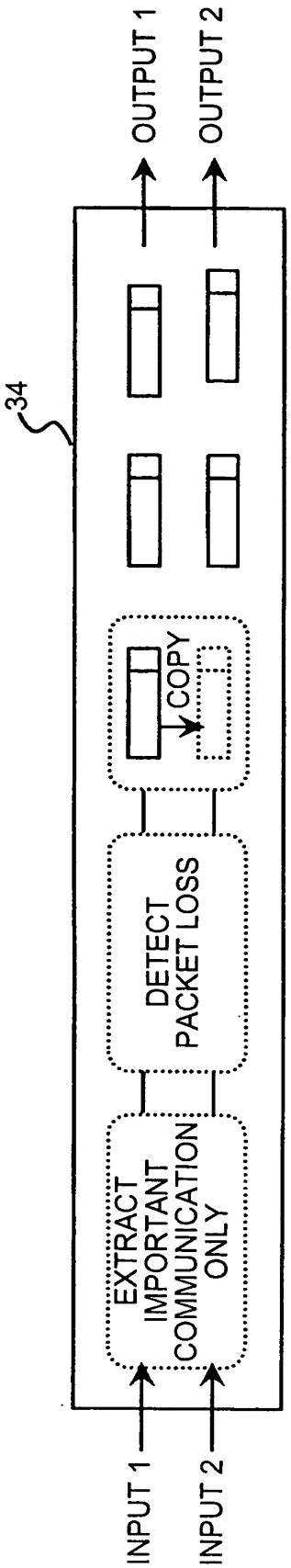

OUTPUT 1
OUTPUT 2
34
COPY
DETECT PACKET LOSS
EXTRACT IMPORTANT COMMUNICATION ONLY
INPUT 1
INPUT 2

FIG.11

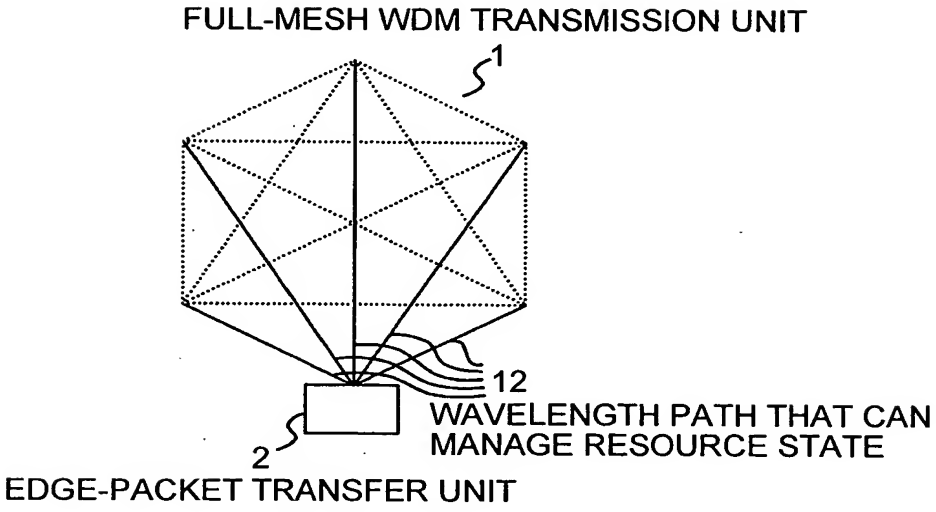

FULL-MESH WDM TRANSMISSION UNIT
1
12
WAVELENGTH PATH THAT CAN MANAGE RESOURCE STATE
2
EDGE-PACKET TRANSFER UNIT

FIG.12

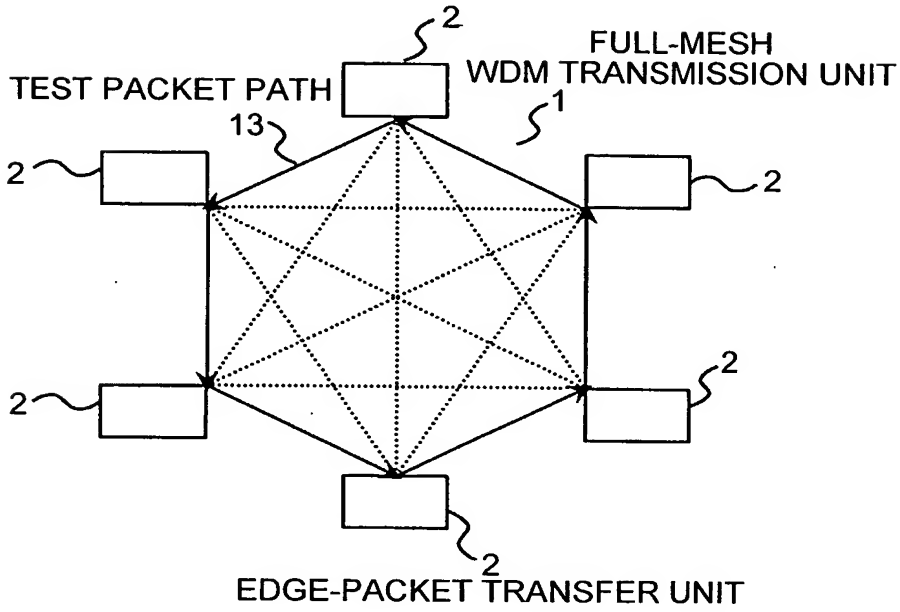

2
FULL-MESH
WDM TRANSMISSION UNIT
TEST PACKET PATH
1
13
2
2
2
2
2
EDGE-PACKET TRANSFER UNIT

FIG.13

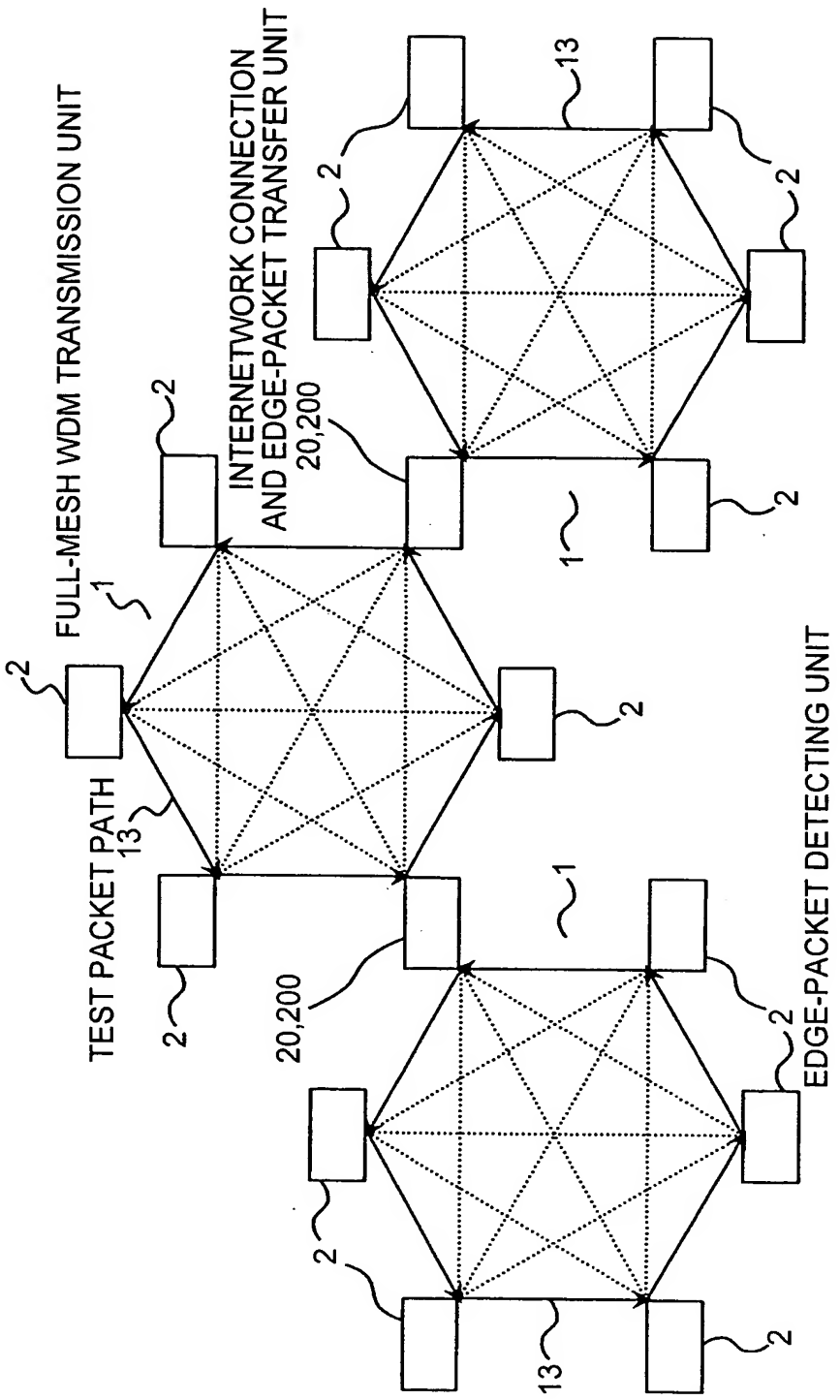

FULL-MESH WDM TRANSMISSION UNIT
INTERNETWORK CONNECTION AND EDGE-PACKET TRANSFER UNIT
TEST PACKET PATH
EDGE-PACKET DETECTING UNIT
1
2
13
20,200

FIG.14

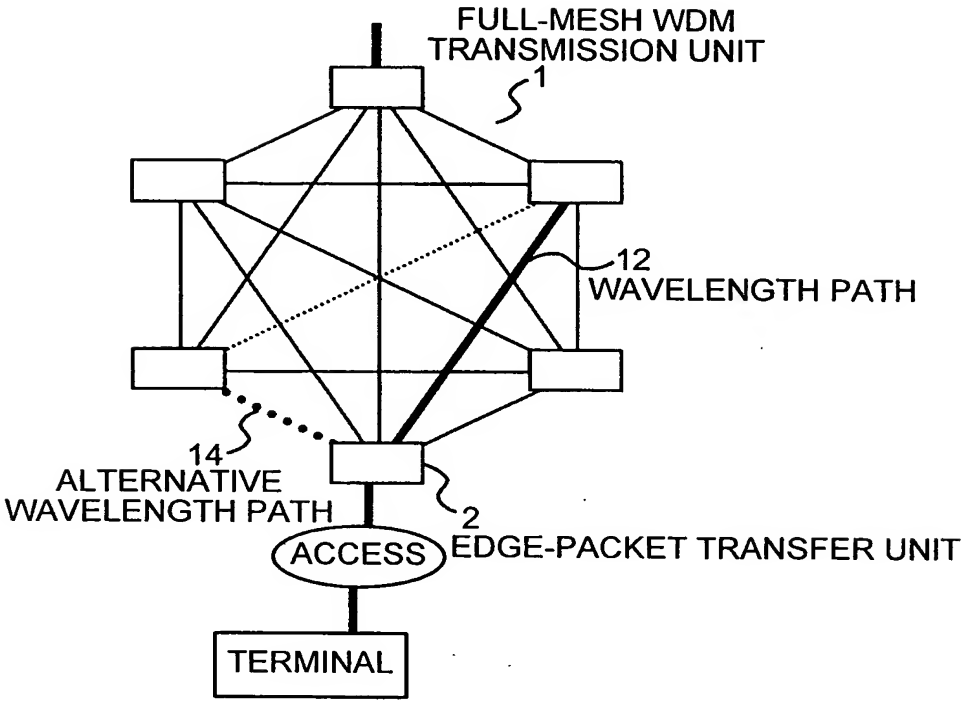

FULL-MESH WDM
TRANSMISSION UNIT
1
12
WAVELENGTH PATH
14
ALTERNATIVE
WAVELENGTH PATH
2
ACCESS
EDGE-PACKET TRANSFER UNIT
TERMINAL

FIG.15

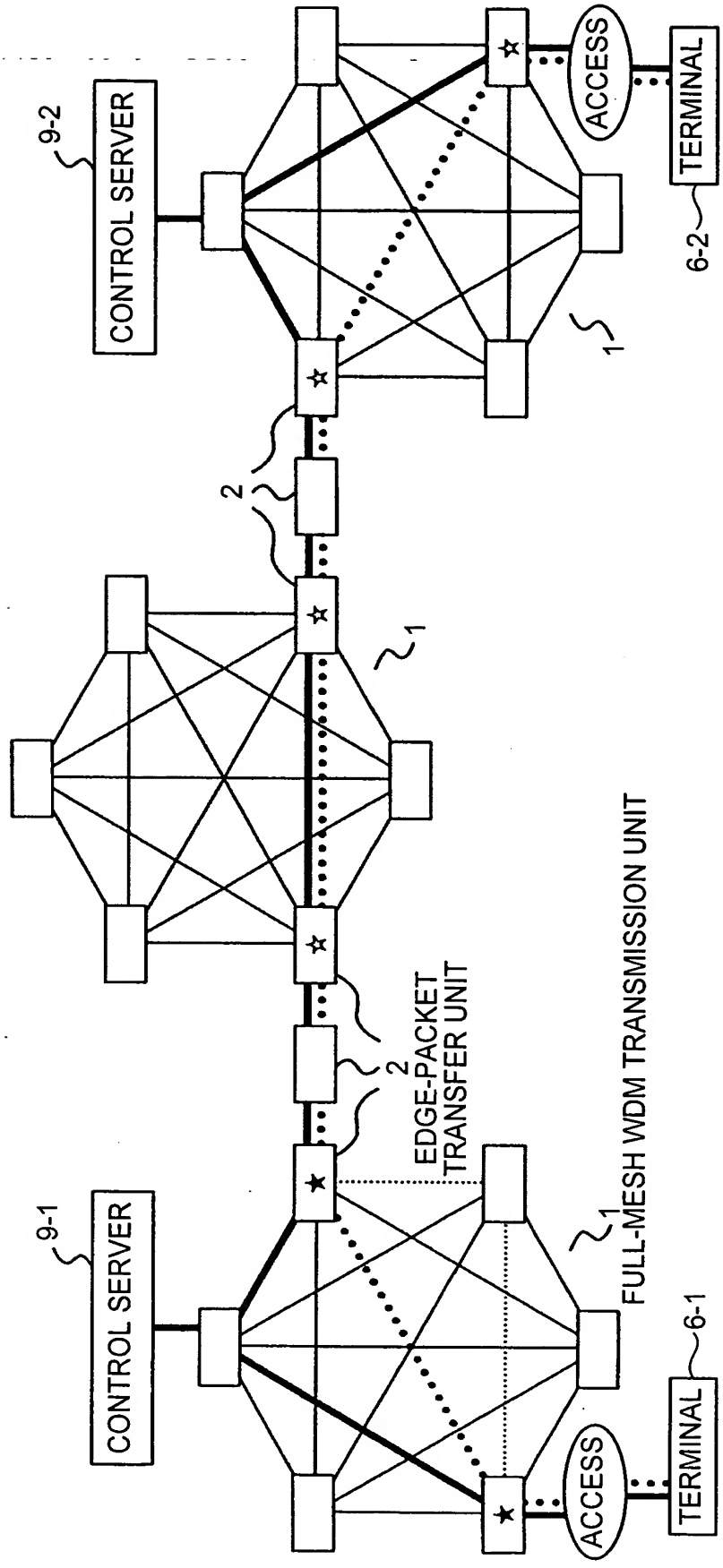

CONTROL SERVER
9-2
ACCESS
TERMINAL
6-2
1
2
EDGE-PACKET TRANSFER UNIT
FULL-MESH WDM TRANSMISSION UNIT
CONTROL SERVER
9-1
ACCESS
TERMINAL
6-1

FIG.16

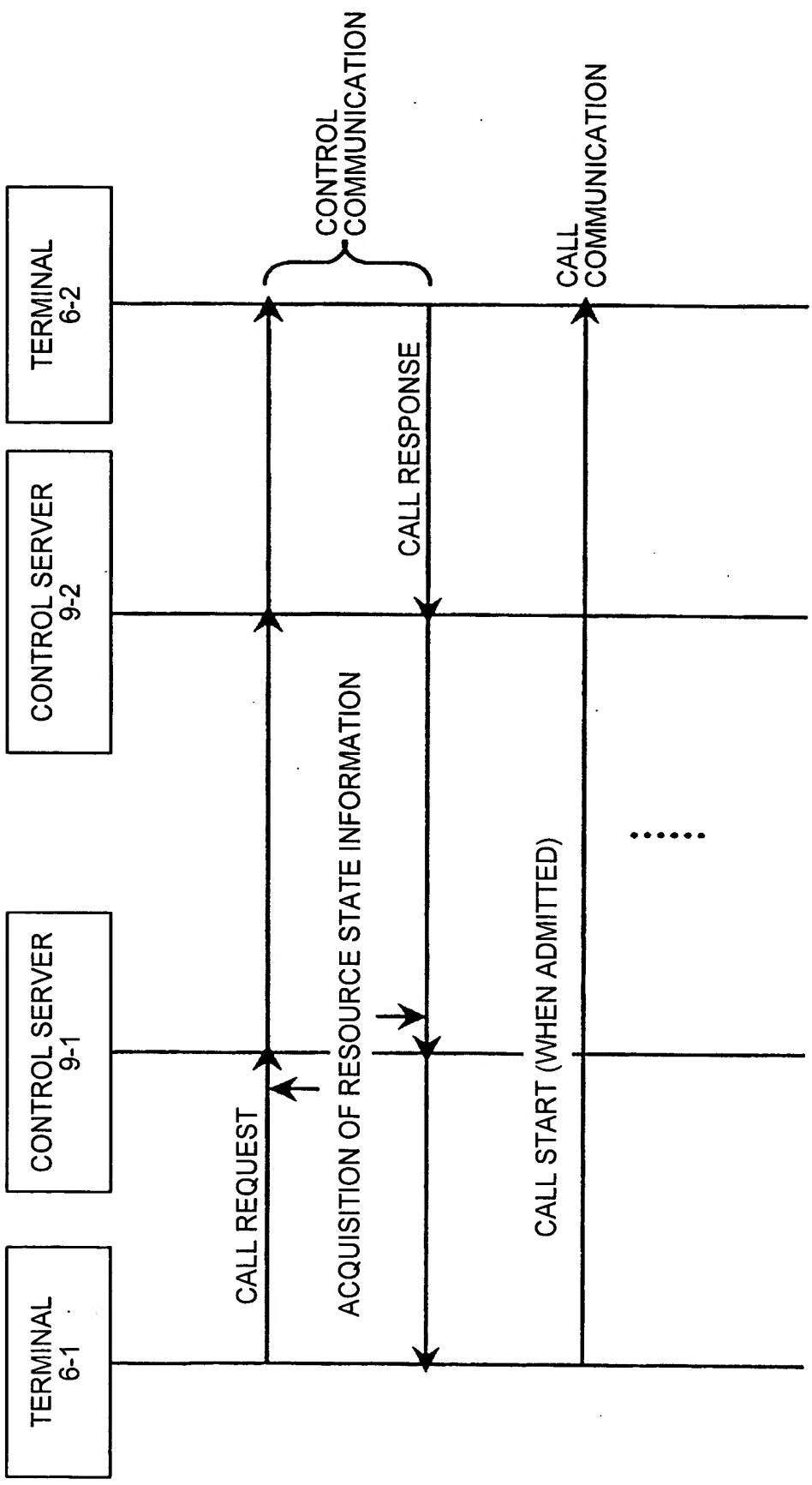

TERMINAL 6-1
CONTROL SERVER 9-1
CONTROL SERVER 9-2
TERMINAL 6-2
CONTROL COMMUNICATION
CALL COMMUNICATION
CALL REQUEST
ACQUISITION OF RESOURCE STATE INFORMATION
CALL RESPONSE
CALL START (WHEN ADMITTED)

FIG.17

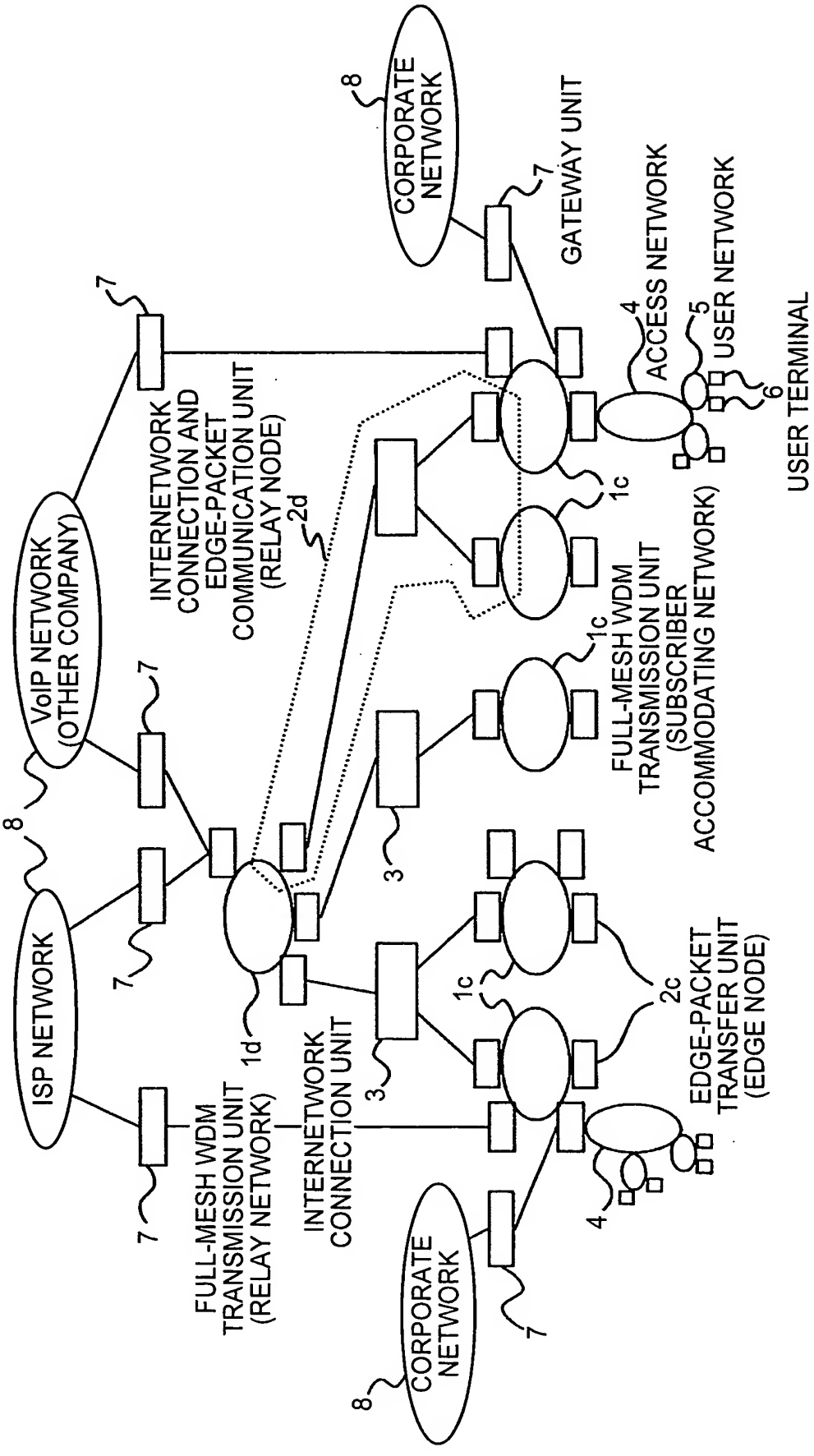

ISP NETWORK
VoIP NETWORK (OTHER COMPANY)
CORPORATE NETWORK
CORPORATE NETWORK
GATEWAY UNIT
ACCESS NETWORK
USER NETWORK
USER TERMINAL
INTERNETWORK CONNECTION AND EDGE-PACKET COMMUNICATION UNIT (RELAY NODE)
FULL-MESH WDM TRANSMISSION UNIT (SUBSCRIBER ACCOMMODATING NETWORK)
FULL-MESH WDM TRANSMISSION UNIT (RELAY NETWORK)
INTERNETWORK CONNECTION UNIT
EDGE-PACKET TRANSFER UNIT (EDGE NODE)
1c
2c
2d
3
4
5
6
7
8
1d

FIG.18

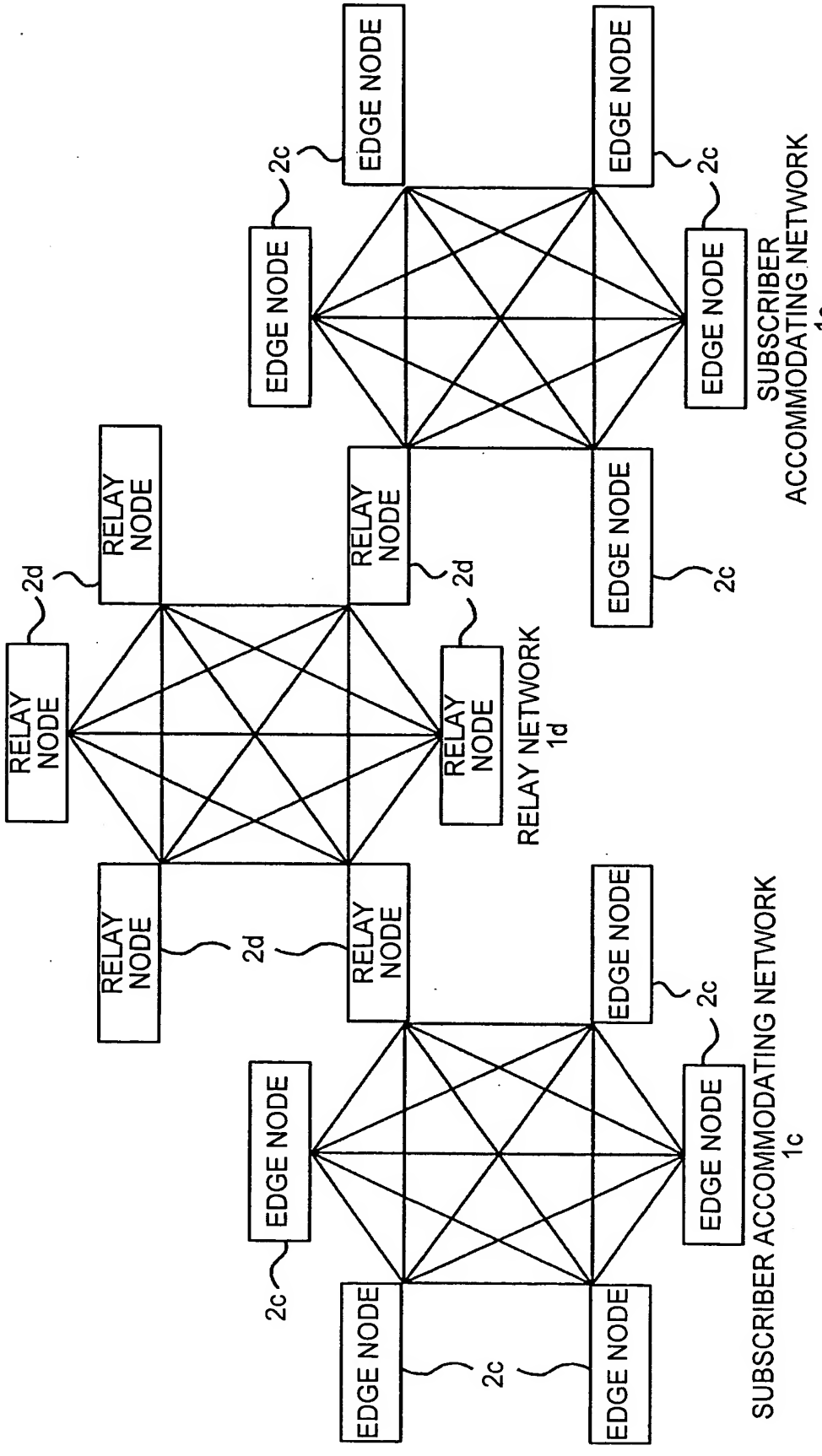

EDGE NODE
2c
SUBSCRIBER ACCOMMODATING NETWORK 1c
RELAY NODE
2d
RELAY NETWORK 1d

FIG.19

CORRESPONDING ROUTING TABLE	DESCRIPTION RULE OF ROUTING TABLE	
	DESTINATION IP ADDRESS	TRANSMISSION SOURCE PORT
SUBSCRIBER ACCOMMODATING NETWORK	OUT OF RANGE BELONGING TO SUBSCRIBER NETWORK ITSELF	PORT CORRESPONDING TO WAVELENGTH PATH TO RELAY NODE
	WITHIN RANGE BELONGING TO EDGE NODE ITSELF	PORT CORRESPONDING TO WAVELENGTH PATH BELONGING TO OWN EDGE NODE
	WITHIN RANGE BELONGING TO THE OTHER EDGE NODE (NUMBER i)	SUB-PORT CORRESPONDING TO WAVELENGTH PATH TO EDGE NODE (NUMBER i)
RELAY NETWORK	WITHIN RANGE BELONGING TO OWN RELAY NODE	PORT CORRESPONDING TO WAVELENGTH BELONGING TO OWN RELAY NODE
	WITHIN RANGE BELONGING TO EDGE NODE (NUMBER k) OF SUBSCRIBER ACCOMMODATING NETWORK (NUMBER j) CONNECTED TO OWN RELAY NODE	SUB-PORT CORRESPONDING TO WAVELENGTH PATH TO EDGE NODE (NUMBER k) OF PORT CORRESPONDING TO SUBSCRIBER ACCOMMODATING NETWORK (NUMBER j)
	WITHIN RANGE BELONGING TO OTHER RELAY NODE (NUMBER l) AND WITHIN RANGE BELONGING TO SUBSCRIBER ACCOMMODATING NETWORK CONNECTED TO OTHER RELAY NODE (NUMBER l)	SUB-PORT CORRESPONDING TO WAVELENGTH PATH TO RELAY NODE (NUMBER l) OF PORT CORRESPONDING TO RELAY NETWORK

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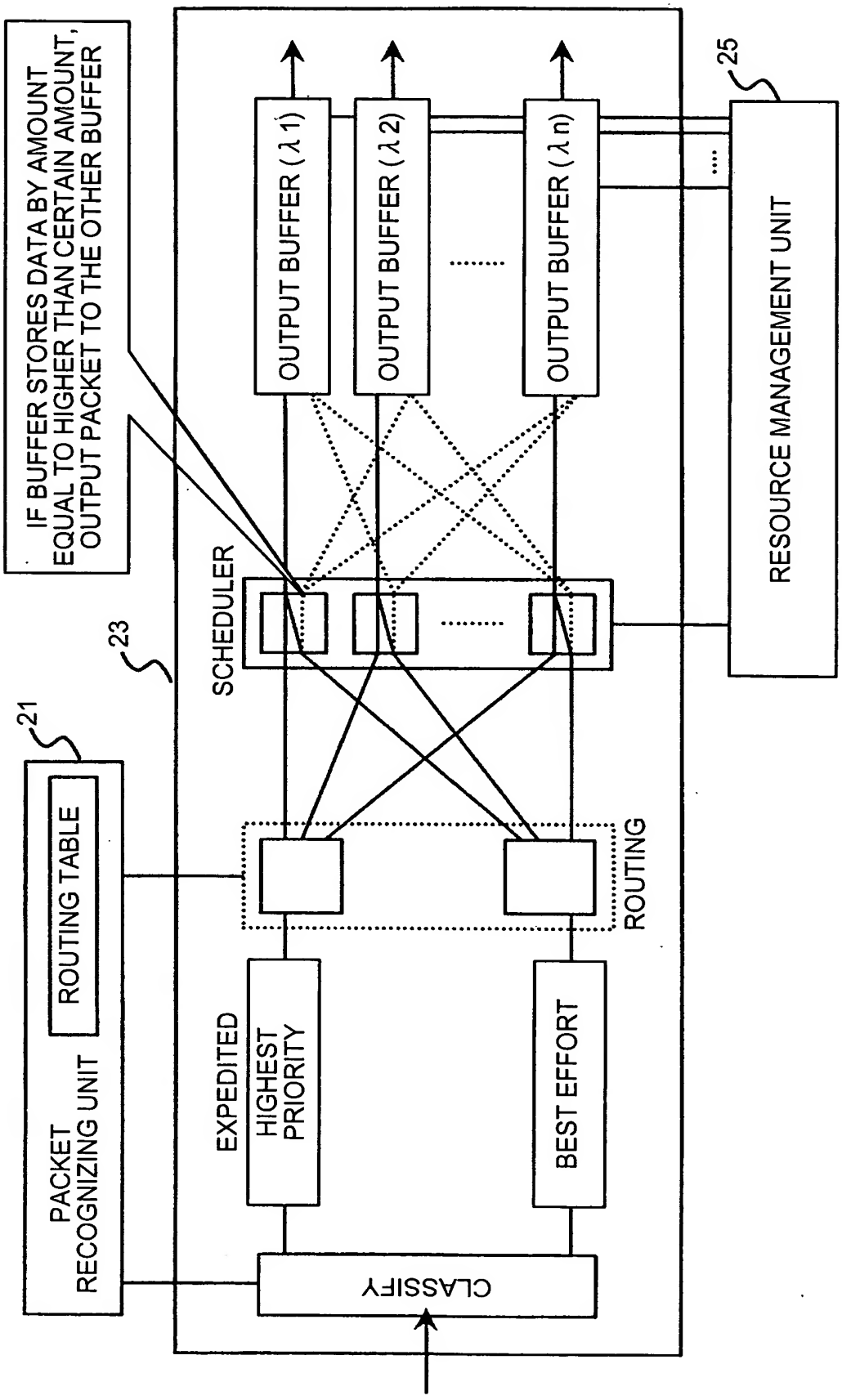
FIG.20


IF BUFFER STORES DATA BY AMOUNT EQUAL TO HIGHER THAN CERTAIN AMOUNT, OUTPUT PACKET TO THE OTHER BUFFER
OUTPUT BUFFER (λ1)
OUTPUT BUFFER (λ2)
OUTPUT BUFFER (λn)
25
RESOURCE MANAGEMENT UNIT
SCHEDULER
23
21
ROUTING TABLE
PACKET RECOGNIZING UNIT
ROUTING
EXPEDITED
HIGHEST PRIORITY
BEST EFFORT
CLASSIFY